

# Quality Assurance Review

## 1.0 Introduction

This document specifies the results of DynCorp's Hazard Ranking System (HRS) package quality assurance (QA) review of the following site:

- **Site Name:** Bozeman Solvent
- **Region:** 8
- **Location:** Gallatin County, Montana
- **DynCorp Reviewers:** Paul R. Kopsick
- **CERCLIS ID No.:** MTD986067627
- **Date of QA Review:** February 22, 1995

The site is briefly described in Section 2. Section 3 summarizes the most significant comments, which are contained in Sections 4 and 5. Every comment listed in Sections 4 and 5 is followed by DynCorp Viar's recommendation for its resolution in italic type.

## 2.0 Site Description

The Bozeman Solvent site is centered around a commercial/retail complex, the Buttrey's Shopping Center, in the 1500 block of West Main Street in a residential portion of the City of Bozeman, southwestern Montana. This first submission of the HRS package scores only the ground water pathway. The site consists of two sources, a sewer line and septic tank. The associated ground water plume covers an area of approximately 320 acres. Ground water in the area is very shallow and in 1989 organic solvents were detected by the State of Montana in drinking water wells servicing a nearby trailer court. A site investigation (SI) was conducted in 1992 and a release to ground water was confirmed. In 1993, sludge from the septic tank was removed by the PRP.

## 3.0 General Comments

The Bozeman Solvent HRS package was reviewed for the following: completeness, correct application of the HRS to the site, mathematical errors, format, style, logic, site characteristics, reference citations, and contradictions between references and the documentation record. In addition to the HRS, the *Regional Quality Control Guidance for NPL Candidate Sites* and the *HRS Guidance Manual* were consulted for the package review.

### 3.1 Overall Package Integrity

The first submission of the HRS package for the Bozeman Solvent, is dated April 1994; however



the NPL Characteristics Form and QC Checklist are dated January 1995. The package was received at DynCorp on January 10, 1995 but DynCorp was not authorized to review the package until January 23 because an SSID number was not provided.

### **3.2 Summary of QA Findings**

The QA review of the Bozeman Solvent site HRS package is divided into two types of comments: major and minor issues. Major issues are those which might have an effect on the site score. Minor issues are not expected to have deleterious effects on the site score but are considered to be errors or problems that should be corrected.

There are several major issues in the package that threaten its listing on the NPL. Foremost are the statements in the documentation record which indicate that certain samples, upon which the site is scored, were either "not individually evaluated (QA/QC)" or "were analyzed by an independent laboratory with no QA/QC information provided; hence, the data are of unknown quality." The *HRS Guidance Manual* (page 58) clearly states that all data used in scoring must be defensible and of known quality.

Other major issues include not identifying all possible sources and the gap of several years between collection of background and release samples used to document an observed release. If the data can be substantiated, only one release sample has an appropriate background sample. This one sample will confirm the observed release, but Level I targets drop to a point where the site will not score... above 28.5. Additionally, the calculations of HWQ require major revisions but, as long as there is at least one Level I target, the overall HWQ factor value of 100 will not change. Other major issues involve the lack of supporting information on well depths and screened intervals.

## **4.0 Major Issue: Observed Release**

### **4.1 Data Quality -- Unvalidated and Unknown Quality**

For several key samples, either the data have not been validated or the data are of unknown quality. The background soil data is not validated; however, if Source 1 is redefined to only constitute the tank (see comment 5.1.1 below), a soils background will not be required. The three soil samples from trench 1 used to document contaminated soils under the leaking sewer lines (Source 2) are reported as not being "individually validated." Furthermore at Source 2 the source sample data from trenches 2 and 3 are not validated while the source sample data from trench 4 are validated. The samples collected from beneath the septic tank and from the seepage pits are reported as being of unknown quality.

*The HRS Guidance Manual (page 58) clearly states that all data used in scoring must be defensible and of known quality. Do not base scoring on data that cannot be defended. Determine if there*

*are samples of known quality that can be used to characterize Source 2 and document the observed release. If there are not, EPA Headquarters will need to determine whether the data are usable.*

## **4.2 Background Samples**

### **4.2.1 Background Samples -- Dates of Samples**

Section 3.1.1, page 19, of the documentation record identifies background samples for four wells. The dates of these samples range from January 1992 through July 1993. This same section identified 11 release samples, however the dates on all but one of these samples are from September and October of 1989, nearly four years before the background samples were collected. There is only one sample, from the Nelson Trailer Court (BSS-GW-5), that has a comparably dated background analysis. Without a comparable background for the 10 other samples, Level I cannot be established for these wells and without these targets the site will not score above 28.5.

*Page 18 of the documentation record alludes to the possibility of SI well data being similar to the 1989 results for several wells. Determine whether the SI's data can be used to establish additional Level I targets. Revise the section accordingly.*

### **4.2.2 Background Samples -- Depths and screened intervals of MW-10, -13 and -14**

The HRS requires that background well samples be in the same aquifer and at similar depths to the release well samples. No information has been provided on the elevation of the background wells with respect to mean sea level (msl). There is also no information provided on the actual (measured) depths of the wells or the locations or presence of screens in these wells.

Upon review of the available topographic maps, the approximate msl of each well was determined. Using the depth below ground surface presented in the doc record for these wells, a case can be made that two of the four wells, MW-10 and MW-14, may not represent background conditions since the presumed depths are shallower than the release samples and they are too shallow to detect the release compound PCE (which sinks because it is denser than water). Please refer to Highlight 5-5 on page 71 of the *HRS Guidance Manual*, and review the discussion on wells A and F. Although the background and target wells may both be located within the same hydrogeologic unit (the alluvial aquifer), there is no proof presented that they are within the same zone or regime of the aquifer to monitor for PCE. This possibility is supported by examining well MW-13 which is close to Source 1. This well is reported to be slightly deeper than MW-10 and -14 and shows PCE contamination.

*Please include within the documentation record the msl, total depth, and screened intervals of all background and release wells. Page 70 of the HRS Guidance Manual states that: "In general, background and release samples should be from approximately the same depths in an aquifer,*

*although different depths may be appropriate under certain circumstances. Factors to consider include aquifer structure, the nature of the hazardous substances, and other possible sources, including natural sources. Ground water tends not to be well mixed, and water quality can vary significantly in the vertical plane within an aquifer. This is particularly true when substances that have a tendency to sink or float in the aquifer are present (i.e. dense non-aqueous phase liquids (DNAPLs) [like PCE] and light non-aqueous phase liquids (LNAPLs)). Depth should be determined to a fixed reference point (e.g., mean sea level) rather than the ground surface to eliminate apparent differences caused by surface topography."*

#### 4.2.2 Background Samples -- Depths and screened intervals of GW-1

Background well, GW-1, is very important to the site score because it is the only well with a sample collected the same day as the contaminated well GW-5 (1-25) which proves Level I contamination. The problem with this well is that the actual depth of the well and screened interval is unknown and there is already a 40-foot difference in elevation at the ground surface between these two wells. The documentation record needs to demonstrate that the well is drawing from the same regime of the aquifer as the release well. If these samples are not similar, then background is not adequately established. Without this background, Level I targets would be questionable and the site would drop below 28.5. Please note that page II-10 of Reference 3 shows that GW-1 (Bus-6) contained a trace amount of PCE, 0.6 ppb, in April of 1990.

*Determine which wells and samples can be used to demonstrate background conditions for the site. Make sure that sampling dates are contemporaneous for both release and background samples. Determine the screened intervals and depths of wells used in scoring to support the assessment of the hydrologic conditions in the aquifer and the issue of DNAPLs.*

#### 4.3 Sources

The Bozeman Solvent HRS package currently identifies only two sources for the volatile organic compounds, a septic tank and seepage pit system, and contaminated subsurface soils beneath a portion of the sewer line feeding into the septic system. In References 3 and 4, numerous potential sources (supported by sampling analytical data) were attributed to an independent PRP search but there is no specific mention of these searches in the documentation record. Furthermore, investigation data suggests that the septic tank, Source 1, isolated the PCE and was not a contributor to the release.

There appears to be sufficient information to list several other sources for this site aside from the contaminated soils below the sewerline. The analytical data, if it is of known quality, showing PCE in the floor sumps or sewers of several up-gradient businesses can be used to identify sources.

*Review the discussion of sources and include all sources where the analytical data indicates that PCE has the potential to enter the sewer line.*

## **5.0 Minor Issues**

### **5.1. Source Description -- Source 1**

#### **5.1.1 Source Characterization -- Source Type**

This source is described as a septic tank and contents, associated seepage pit, plumbing and subsurface (contaminated) soils beneath the tank and seepage pits. This characterization identifies two different HRS source types: tanks and contaminated soil, each with different divisors.

*If both the septic tank and soils are to be evaluated at this unit, separate them into two distinct sources as they are different source types under the HRS.*

#### **5.1.2 Source Characterization -- Containment**

The identification of volatile organic compounds in both the release samples and the septic tank can be used to show at least partial attribution of the wastes to this source, but it does not identify this as the only potential source for these contaminants. The observed release is from the site, not from a single source. Therefore containment should be evaluated for each source according to Table 3-2 of the HRS.

*Please determine a containment value for this source using terminology based on Table 3-2 of the HRS. State clearly the supporting evidence, such as: "sample xx from beneath the tank contained xx ppb..."*

#### **5.1.3 Hazardous Waste Quality Factor Value -- Source 1**

The package currently evaluates Source 1 as Tier A, hazardous constituent quantity, based on an average concentration of PCE from two samples of sludge. This average concentration is then extrapolated to the entire volume of sludge removed from the tank. Aside from the use of only two samples to generate an average value, it turns out that the samples were collected from the same location (north half of the partitioned tank at a depth of 7 to 8 feet [the diameter of the tank being 8 feet]) after the majority of the sludge and liquid was removed. Furthermore, there is confusion with regard to the matrix type of the two samples. One is listed as a sludge sample and the other as possibly a liquid (oil). There are hand-written corrections to the reference which change the sampling matrix from liquid to solid, but the justification for the change is not cited. The field log indicates the samples being collected one hour and forty five minutes apart and infers that one is of sludge and the latter is of oil. There is no mention of any analysis done on the 63 drums of sludge removed from the tank and later disposed of or of the 11 that required incineration, presumably based on laboratory analysis of the drums.

It appears that Tier A cannot be properly evaluated based on the present level of data. As long as Level I or II contamination exists, only a positive HWQ factor value need be established to assign a HWQ factor value of 100. Tier C can be used to establish HWQ, however, there are possible problems with the calculation of Tier C as presented in section 2.4.2.1.3 of the documentation record. The tank is said to hold 6,000 gallons, yet the calculation shows 2,250 gallons of liquid and 4,015 gallons of sludge being removed. This accounts for 6,265 gallons of a 6,000 gallon tank.

*Do not evaluate Tier A for the tank. When evaluating Tier C, do not account for more than 6,000 gallons of material unless it can be explained how this can happen. If Tier C can be established, delete the discussion of Tier D, area.*

## **5.2 Source Description -- Source 2**

### **5.2.1 Source Characterization -- Containment**

The identification of volatile organic compounds in both the release samples and the contaminated soil can be used to show at least partial attribution of the wastes to this source, but it does not identify this as the only potential source for these contaminants. The observed release is from the site, not to a single source. Therefore containment should be evaluated for each source according to Table 3-2 of the HRS.

*Please determine a containment value for this source using terminology based on Table 3-2 of the HRS. State clearly the supporting evidence, such as: "native soil, no liner present."*

### **5.2.2 Hazardous Waste Quality Factor Value - Source 2**

Preliminary calculations on both Tiers C and D were presented for Source 2, with the area measurement (Tier D) returning a higher HWQ factor value for scoring. For all future submissions, only calculations for one tier should be presented. The measurements for volume and area should follow the methodologies prescribed on page 360 of the *HRS Guidance Manual* for delineating the area of observed contamination, specifically the area between contaminated soil samples. The use of the generalized dimensions of the trenches (10' X 4') does not conform with existing guidelines for calculating area based on triangulation between at least three contaminated samples. To use the full area of the trench, four positive samples would have to have been collected from each corner of the trench. Figures 4-10, -11, and -12 of Reference 4 clearly show that the samples indicating PCE contamination were not taken over the dimensions of the trenches but were localized to just below the pipe joints and were for that matter sampled vertically.

*If the volume or area of contaminated soil cannot be estimated by triangulation, state that the volume or area of contamination is unknown, but is greater than zero. If other HRS sources are*

*evaluated, as where PCE was identified in sumps or drains connected to the sewer line and upgradient from the trenches, the same logic can be used to assess waste quantity.*

### **5.3 Aquifer Description**

The discussion of the aquifer of concern at this site is too brief and, in parts, contradictory. Only a few pages of the U.S.G.S. report were provided as supporting documentation (Reference 7).

DynCorp suggests that the name of the aquifer be the Bozeman Fan. Page 152 of Reference 7 states that "The alluvium composing the [Bozeman] fan is the principle aquifer in the area." It would be helpful to also describe the underlying Tertiary unit as not being a water bearing unit. Page 154 states, "The Tertiary strata penetrated by the test holes were relatively impermeable."

The discussion of the thickness of the fan needs clarification since it is listed as "nearly 200 feet (thick)" in one sentence and "(up to 400 feet deep)" in another.

The statement that "Local drilling logs (Reference 8, pages 41-56) indicate that the alluvial groundwater system under the site can be considered one continuous hydrologic unit with no discontinuities" is not explained to the reader. It is not even clear which wells are being used for this assessment, where they are located, or what bearing they have on the statement. If statements are made that require interpretation, make the interpretations first and support them clearly with documentation.

Reference 8 does not support that a clay-silt unit exists 90 feet below ground surface as stated. Reference 8 does indicate clay and claybound sand and gravel units at various depths below ground surface. Some clay units are substantially thick, -49' to -65' (16' thick) and -72' to 81' (9' thick) calling into question the assessment that the fan behaves as a single hydrologic unit (Reference 8, page 42).

Reference 8 is also cited to demonstrate that the thickness of the saturated alluvium is up to 400 feet deep. The majority of the well logs in Reference 8 are between 75' and 118' deep. Two wells, which do not have well logs associated with them, were presumably drilled to 165 and 198 feet respectively. It cannot be confirmed that these deeper wells did not intersect the underlying Tertiary rock. Even if they were still in the Bozeman Fan at a depth of 200 feet, they do not support the statement that the aquifer is up to 400 feet deep.

*Please rewrite the ground water section addressing all of the points noted above. Present your interpretations of the data so your logic can be confirmed, do not just make statements and present*

*raw data. For example, to demonstrate that a clay layer is not continuous within two miles of the site, show the locations of the wells from Reference 8 on a scaled map that was used to come to that determination and point out the absence or presence of the clay layer.*

#### **5.4 Observed Release**

##### **5.4.1 Attribution -- Release Compounds Not Included**

There are several other release compounds (TCE and DCE) mentioned in the HRS package but never fully documented.

*Review the decision not to include the data on these compounds in light of the problems with well depths and sample dates.*

##### **5.4.2 Attribution -- Upgradient Sources of PCE**

It has been demonstrated that there are problems with documentation of the wells used to determine background conditions for the site/sources. It is questionable whether the statement that "there are no upgradient sources of PCE at the site" on page 19 of the documentation record can be substantiated based on the data presented for these wells.

*Revise this statement as needed when the issue of appropriate background wells and samples has been resolved.*

#### **5.5 Waste Characteristics**

##### **5.5.1. Toxicity/Mobility**

DCE and TCE are included in the list of hazardous substances based on samples 1-19, 1-28, 1-29, 1-32, 1-34, and 1-36. The analytical data to support this is not part of the documentation record.

*If DCE and TCE are to be evaluated for scoring, present primary data in the body of the documentation record. State clearly when and why the mobility factor value assigned to a compound differs from the SCDM tables.*

##### **5.5.2 Hazardous Waste Quantity**

The HWQ factor value does not default to 100 for an observed release (page 20 of documentation record). Section 2.4.2.2. page 51592 of the HRS, states that you can use a minimum factor value of 100 when there are Level I or II targets.

*State clearly the reason why an HWQ factor value of 100 is being used.*



## 5.6 Targets

Depending upon the resolution of the well depths and sampling dates, the number of Level I targets may change. The wells listed as potential contamination requires more explanation since the cited reference is a portion of the U.S.G.S hydrology report and makes no mention of wells. It appears that Reference 8 was intended to show which wells were at what distance from the site.

*Reevaluate the Level I targets, nearest well, and target population when the issue of appropriate background wells and sampling dates has been resolved. Show all calculations for potential contamination population and weighted values.*

*The edited computer printout of well locations should be a separate reference. Make a memo to the file, give it a cover page and explain how the distances were computed and who made the measurements. Attach the printout and a refer to the maps (Reference 15) for the locations of the wells.*

## 5.7 References

*Regional QC Guidance page 17, discusses that when the entire text of publically available reports are not supplied as a reference, then the title page, table of contents and those chapters pertinent to the discussion should be included.*

*Identify the origin of all reference material in the reference itself (title pages, cover letters, etc.). If annotations are made to the original reference explain who is making the annotations and what they signify. Make sure all pagination is clear and reproducible since many of the page numbers could not be read.*

## 5.8 Editorial Comments

Editorial comments are presented in the annotated copy of the documentation record is required. The more extensive ones are presented in the following table.

<b><i>Page of Documentation Record</i></b>	<b><i>Comment</i></b>
i	Sites names should not contain the term "site".
iv	<i>Please use and cite the most recent version of SCDM.</i>
iv	Reference 8 does not indicate that water well logs are part of this reference. <i>Place the well logs in a separate reference, provide a cover sheet, paginate clearly, explain any edits made on the original documents.</i>

<i>Page of Documentation Record</i>	<i>Comment</i>
iv	Titles and affiliations are not provided for telephone records. <i>Please state the title and affiliation of all persons contacted.</i>
1	The length of the tank has not been stated. This number would be helpful in confirming the volume of the tank.
1	<i>Please provide the dates for the removal action and the SI.</i>
9	<i>Please explain the sentence, "All depth grab soil samples."</i>
12	The calculation of area contains a typo, 40 feet instead of 4 feet, however this calculation may be inappropriate anyway. (See Section 5.2.2 of this review)
14	The containment value for the sources under the ground water column should contain a value and not the words "Yes". <i>Please use the containment value for the sources as determined from Table 3-2 of the HRS.</i>
15	<i>Please delete heading for a deep aquifer since none has been cited.</i>
16	<i>Please provide units of depth and ground surface elevations for all wells used in scoring.</i>
17	Any mention of the possibility that the 8.1 ppb of PCE in well BSS-MW-13 "may be due to sampling methods" should be fully evaluated as it infers problems existed in sampling. <i>It should be determined whether sampling methods can be ruled out completely as a source of the contamination in well BSS-MW-13. If sampling method is a valid issue it should be discussed fully in the documentation record.</i>
18/24	An asterisk is used in the concentration column that does not show up in any legend or footnote. <i>Please explain the asterisk or delete it.</i>
24	<i>Please change the calculation of people per household in Reference 9 to state that the number 2.5 is an average.</i>
Figure 3	This map does little to assist the reviewer on ground water pathway issues, however it is helpful in understanding the site setting. <i>Please upgrade the map to include north arrow and source.</i>